and giving the two results equal weight, the following are the revised elements of variation of *UY Cygni*:

$$\begin{aligned} T_0 &= 1900 \text{ November } 22,\ 8^h\ 3^m{\cdot}5 \text{ (G.M.T.)} \\ &\quad + 13^h\ 27^m\ 25^s{\cdot}37\ E \\ &= \text{J.D. } 2415346{\cdot}3358 + 0^d{\cdot}5607103\ E \\ \text{Maximum} &= 1900 \text{ November } 22,\ 9^h\ 26^m{\cdot}3 \text{ (G.M.T.)} \\ &\quad + 13^h\ 27^m\ 25^s{\cdot}37\ E \\ &= \text{J.D. } 2415346{\cdot}3933 + 0^d{\cdot}5607103\ E \end{aligned}$$

The times of T_0 and of maximum according to these elements will be found in the sixth columns of the foregoing tables, and the differences O—C in the last columns.

Note on the Variable RZ Lyræ.

R.A. = $18^h\ 39^m\ 54^s$, Decl. = $+32°\ 41'{\cdot}7$ (1900).

About 400 observations of the brightness of this star have been obtained during the past two years; but as the elements published in the *Ast. Nach.* 3880 still indicate the time of maximum within a few minutes, it does not seem necessary to discuss these at present. It may be mentioned, however, that the visual light-curve of the star corresponds very closely with the photographic light-curve published by Herr R. S. Dugan in the *Ast. Nach.* 3898.

Hove: 1905 *March* 22.

Revised Elements of Y Lyræ (*Ch.* 6685).

R.A. = $18^h\ 34^m\ 12^s$, Decl. = $+43°\ 51'{\cdot}8$ (1900).

By A. Stanley Williams.

The period of variation of this star published in the *Monthly Notices* for January 1902 was derived solely from the comparison of three photographs. Two of these, dated respectively 1899 December 31 and 1900 September 3, had evidently been taken when the star was nearly at its maximum brightness, and in November 1901 several photographs were taken near maximum, one of which was selected as seeming to show practically the same phase as the other two. Although the resulting period of $12^h\ 3^m\ 52^s{\cdot}21$ still satisfies closely the observations, yet it now seems desirable to derive fresh elements of variation from the visual observations alone, since the latter now extend over a period of four years.

Table I. contains all the observed times of T_0, that is, the

time when the variable in its rapid rise from minimum attained to equality with the comparison star l ($12^{m}\cdot 1$). These observations were all made by the writer with a $6\frac{1}{2}$-inch reflector, excepting that of 1901 October 25, which is derived from the observations by Dr. E. Hartwig at Bamberg, published in the note at the foot of page 205 of vol. lxii. of the *Monthly Notices.* The different columns of the table will sufficiently explain themselves. The approximate corrections for the equation of light have been applied, although this correction is never very large in the case of *Y Lyræ.*

TABLE I.

Observed and Computed Times of T_0.

E.	Date.	Observed T_0.	Red to ⊙.	Helioc T_0.	Computed T_0.	O–C.	
	1901	h m	m	h m	h m	m	
1184	Aug. 18	10 22	+2·4	10 24·4	10 11·0	+13·4	
1186	19	10 10	+2·3	10 12·3	10 18·8	− 6·5	
1188	20	10 10	+2·3	10 12·3	10 26·5	−14·2	
1190	21	10 30	+2·3	10 32·3	10 34·3	− 2·0	
1192	22	10 40	+2·2	10 42·2	10 42·1	+ 0·1	
1194	23	10 41	+2·2	10 43·2	10 49·9	− 6·7	
1196	24	10 50	+2·2	10 52·2	10 57·6	− 5·4	
1200	26	11 11	+2·1	11 13·1	11 13·1	0 0	
1218	Sept. 4	12 7	+1·7	12 8·7	12 22·9	−16·2	
1309	Oct. 20	6 11	−0·7	6 10·3	6 15·8	− 5·5	
1319	25	7 2	−1·0	7 1·0	6 54·7	+ 6·3	H
1337	Nov. 3	8 12	−1·5	8 10·5	8 4·6	+ 5·9	
	1902.						
1757	June 2	11 13	+2·7	11 15·7	11 13·6	+ 2·1	
1918	Aug. 22	9 30	+2·2	9 32·2	9 38·2	− 6·0	
1950	Sept. 7	11 49	+1·6	11 50·6	11 42·3	+ 8·3	
1952	8	11 52	+1·6	11 53·6	11 50·1	+ 3·5	
	1903.						
2521	June 21	12 37	+2·7	12 39·7	12 37·2	+ 2·5	
	1904.						
3231	June 12	10 35	+2·9	10 37·9	10 31·2	+ 6·7	
3243	18	11 20	+3·0	11 23·0	11 17·8	+ 5·2	
3400	Sept. 5	9 22	+1·6	9 23·6	9 26·8	− 3·2	
3408	9	9 50	+1·5	9 51·5	9 57·7	− 6·2	
3410	10	10 3	+1·5	10 4·5	10 5·5	− 1·0	

Table II. gives in similar form the observed times of maximum. Those marked with H in the last column were observed by Hartwig at Bamberg,* the others by the writer. The three observations marked with a "p" are the three

* *V.J.S. der Astron. Gesell.*, Jahrgang 36, Heft 3/4, p. 268.

photographic observations previously alluded to. They were not used in the calculations, and have been inserted here merely for the sake of comparison.

Table II.

Observed and Computed Times of Maximum.

E.	Date.	Observed Max.	Red to ☉.	Helioc. Max.	Computed Max.	O−C.
		h m	m	h m	h m	
0	1899. Dec. 31	[6 43·5]	−3·1	[6 40·4]	6 35·3	[+ 5·1] p
490	1900. Sept. 3	[14 17·5]	+1·8	[14 19·3]	14 16·0	[+ 3·3] p
1184	1901. Aug. 18	[11 51]	+2·4	[11 53·4]	11 7·9	[+45·5]
1186	19	11 32	+2.3	11 34·3	11 15·7	+18·6
1188	20	11 34	+2·3	11 36·3	11 23·4	+12·9
1190	21	11 33	+2·3	11 35·3	11 31·2	+ 4·1
1192	22	11 33	+2·2	11 35·2	11 39·0	− 3·8
1194	23	11 45	+2·2	11 47·2	11 46·8	+ 0·4
1196	24	12 13	+2·2	12 15·2	11 54·5	+20·7
1200	26	12 11	+2·1	12 13·1	12 10·0	+ 3·1
1218	Sept. 4	13 32	+1·7	13 33·7	13 19·8	+13·9
1309	Oct. 20	7 10	−0·7	7 9·3	7 12·7	− 3·4
1323	27	8 0	−1·1	7 58·9	8 7·2	− 8·3 H
1331	31	8 22	−1·3	8 20·7	8 38·1	−17·4 H
1333	Nov. 1	8 24	−1·4	8 22·6	8 45·9	−23·3 H
1335	2	8 32	−1·4	8 30·6	8 53·7	−23·1 H
1337	3	8 34	−1·5	8 32·5	9 1·5	−29·0 H
1337	3	9 12	−1·5	9 10·5	9 1·5	+ 9·0
1339	5	[9 11]	−1·6	[9 9·4]	9 9·2	[+ 0·2] p
1757	1902. June 2	12 7	+2·7	12 9·7	12 10·5	− 0·8
1918	Aug. 22	10 42	+2·2	10 44·2	10 35·1	+ 9·1
1950	Sept. 7	12 43	+1·6	12 44·6	12 39 2	+ 5·4
1952	8	12 51	+1·6	12 52·6	12 47·0	+ 5·6
3243	1904. June 18	12 3	+3·0	12 6·0	12 14·7	− 8·7
3384	Aug. 28	9 10	+2·0	9 12·0	9 21·6	− 9·6
3386	29	9 40	+1·9	9 41·9	9 29·4	+12·5
3396	Sept. 3	10 4	+1·7	10 5·7	10 8·1	− 2·4
3400	5	10 13	+1·6	10 14·6	10 23·7	− 9·1
3408	9	10 49	+1·5	10 50·5	10 54·6	− 4·1
3410	10	11 6	+1·5	11 7·5	11 2·4	+ 5·1

From the observations of T_0 a period of $0^d{\cdot}5026941$ was derived, and from those of the maximum one of $0^d{\cdot}5026930$.

Giving the former result double weight, the following are the revised elements of variation of *Y Lyræ*:

$$T_0 = 1899 \text{ Dec. } 31,\ 5^h\ 38^m{\cdot}4\ (\text{G.M.T.}) + 12^h\ 3^m\ 52^s{\cdot}74\ E$$
$$= \text{J.D. } 2415020{\cdot}2350 + 0^d{\cdot}5026937\ E$$
$$\text{Maximum} = 1899 \text{ Dec. } 31,\ 6^h\ 35^m{\cdot}3\ (\text{G.M.T.}) + 12^h\ 3^m\ 52^s{\cdot}74\ E$$
$$= \text{J.D. } 2415020{\cdot}2745 + 0^d{\cdot}5026937\ E$$

The computed times of T_0 and of maximum will be found in the sixth columns of the foregoing tables, and the differences O−C in the last columns. With reference to these latter it should be noted that Hartwig seems to have systematically observed the maxima earlier than the writer, and that the grouping of the residuals is suggestive of the existence of subjective influences. In particular the late maximum of 1901 August 18, the first visually observed, is probably due to a struggle on the part of the observer against the rapid decline in brightness after maximum. There are no observations of maximum in 1903 and only one of T_0. *Y Lyræ* is rather a faint variable for observation with a $6\frac{1}{2}$-inch aperture, and a very clear night and absence of moonlight are essential in order to obtain a satisfactory series of observations. In the year above mentioned unfortunately all the clear and cloudless nights, when the maxima were observable, occurred when there was a bright moon. All the times of T_0 and of maximum given in the preceding tables and observed here were derived from single curves, though, as regards the maxima at any rate, a somewhat greater accordance might have been obtained by the use of a mean light-curve.

It should be mentioned that a slightly different light-scale was used in reducing the observations of 1902–4. In 1901 the observations had been made with the eyes kept normal to a line joining the stars A and *b* (see the diagram in the *Monthly Notices*, vol. lxii. p. 201), but in the subsequent years they were made with the head so held that the eyes were parallel to a straight line joining the two stars undergoing comparison. The following is the light-scale used in reducing the observations of 1902–4, with the assumed magnitudes of the comparison stars:

Star.	Light-scale.	Mag.
d	38·4	10·11
c	29·9	10·70
h	15·8	11·69
l	10·0	12·10

It does not seem likely that any sensible difference will have been caused in the time of T_0 by the change of scale, the position of the comparison star relative to the minimum brightness of the variable being nearly the same in both scales.

Hove: 1905 *March* 9.

Value of Meteoric Radiants based on Three Paths.
By W. F. Denning.

With regard to the validity of radiants derived from only three paths, discussed mathematically by Mr. H. W. Chapman (*Monthly Notices*, 1905 January, p. 238), I would like to offer a few remarks from an observer's point of view.

1. I believe that, as a rule, radiants determined from three paths are useless or at least extremely doubtful, especially when the observers responsible for them have not gained considerable experience in meteoric work.

2. There are particular cases, however, where three meteors may indicate good radiants, and these are when the latter are low in altitude or very near the horizon. In such instances the meteors traverse long paths; they have comparatively slow motions ascending, and the discriminating observer can entertain no doubt as to the place of divergence. On the other hand, the greatest uncertainty must attach to short, swift meteors falling almost vertically in low positions. When the flights of these are carried back in the same lines they may each cross a dozen or more active radiants.

3. Under ordinary circumstances it is far from safe to accept centres resting upon less than five paths. If very meagrely supported positions are included in our catalogues and accorded equal weight with others well determined from ten or twenty tracks it will be impossible to get good mean positions, and the records of this branch will soon be burdened with many non-existent showers occasioning doubts and complications very difficult to eliminate.

4. As there are a multitude of showers distributed over the sky some of the radiants lie near together, and there must naturally occur a large number of accidental intersections of three meteors forming false appearances of radiation.

5. Of course much depends upon the experience, judgment, and method of the observer. Those who rely only upon the directions of flight will frequently deduce false positions, as this is an insufficient criterion. Others who carefully sort the meteors according to their individual velocities, streaks, trains, &c., and also consider the length of path and position of the assumed radiant relatively to the horizon, will seldom err.

6. There are very marked differences in the capacity of individual observers. Considerable practice will not make every observer reliable and accurate. Some workers in this department will generally ascertain radiants within 1° or 2° of probable error, while others will ordinarily make mistakes of 5° or 10°, and fictitious radiants will occur so frequently in the results of the latter as practically to negative their value.

7. In estimating the validity of radiants resting on very few tracks it is, therefore, most important to consider the authority